

HETEROJUNCTION BIPOLAR TRANSISTOR WITH SELF-ALIGNED EMITTER AND SIDEWALL BASE CONTACT

ABSTRACT

5 A heterojunction bipolar transistor (HBT), and manufacturing method therefor,
comprising a semiconductor substrate having a collector region is provided. A base contact
layer is formed over the collector region, and a base trench is formed in the base contact layer
and the collector region. An intrinsic base structure having a sidewall portion and a bottom
portion is formed in the base trench. An insulating spacer is formed over the sidewall portion
10 of the intrinsic base structure, and an emitter structure is formed over the insulating spacer
and the bottom portion of the intrinsic base structure. An interlevel dielectric layer is formed
over the base contact layer and the emitter structure. Connections are formed through the
interlevel dielectric layer to the collector region, the base contact layer, and the emitter
structure. The intrinsic base structure is silicon and at least one of silicon-germanium,
15 silicon-germanium-carbon, and combinations thereof.

Figure 10